Executive Summary

Proposed Action and Alternatives

The U. S. Department of Energy (DOE), in this Environmental Assessment (EA), reports the results of an analysis of the potential environmental impacts from the proposed construction of various site improvements and the proposed installation and operation of the Helios light source at the Thomas Jefferson National Accelerator Facility (Jefferson Lab) in Newport News, Virginia. Jefferson Lab is operated by the Southeastern Universities Research Association, Inc. (SURA) under contract to DOE.

With this proposal, DOE intends to construct no more than four major two or three story additions totaling about 151,000 sq. ft. (square feet) to CEBAF Center, the main facility administration building, and the addition of three new single story and one two story operations support structures on the accelerator site. The structures are a 28,000 sq. ft. storage building, a 15,100 sq. ft. technical support building, a 3,500 sq. ft. refrigeration service building, and a two-story 22,600 sq. ft addition to the Free Electron Laser (FEL) facility. The proposed action also involves the installation and operation of the Helios (High-Energy Lithography Source) accelerator in the FEL Addition.

DOE proposes to take this action to provide Jefferson Lab with improved staff and operations support facilities that, along with the operation of Helios, will provide an increased capability to facilitate accelerator and physics program operations.

Support activities necessary to effect the installation and operation of Helios would begin in Fiscal Year (FY) 03. It is expected that the Helios machine should be available to serve developmental and operational activities in support of the physics program later in FY 04.

In this EA, DOE presents the no action alternative, alternatives considered and dismissed, and the proposed action alternative. It also evaluates the impacts of each.

No Action Alternative

If no action is taken to fund any of the projects noted, the facility would continue operating as it does today using the present buildings as effectively as possible. Specifically, if no action is taken on the proposal to put additions on CEBAF Center and the FEL Facility the current site buildings will not have sufficient space to accommodate the growing staff and user community. As well, if no action is taken to provide for existing CEBAF (Continuous Electron Beam Accelerator Facility) and FEL operations support staff and their storage needs, it could become an important factor in maintaining both CEBAF and the FEL functionality. If no action is taken on the proposal to add a new end station refrigeration support structure, proposals for future physics experiments would be limited due to the lack of cryogenic system capacity. With no action the physics community would miss out on the opportunity to use the new synchrotron light source to expand research capabilities and also would not be able to explore the future opportunities for joint Helios and FEL operations.

Alternatives Considered and Dismissed

This section reviews other options that were considered in this EA including: on-site alternatives, the choice to lease offsite space, and the use of additional portable storage containers.

Alternatives reviewed for the proposed CEBAF Center additions included building at one of two other locations on the site and just continuing to lease offsite space to meet current demands. The Technical Support Building was also considered for another location on the site and a second alternative was to lease additional space offsite. The proposed storage building was reviewed for an alternate location on the accelerator site, expanding the use of portable storage containers, and leasing additional offsite space.

The selected sites appear to make the best use of the existing site infrastructure and mostly limit disturbance to areas that are immediately adjacent to existing structures.

No alternative locations were available for the FEL Addition, as proximity to the FEL accelerator and its support staff was a priority. There is no existing building on site that was of sufficient size that could be used to operate the Helios accelerator so the location for the new FEL Addition was the only suitable choice.

Impacts for the Proposed Action and Alternatives

The findings of the impacts analysis of resources that could be affected by the proposed action or any of the alternatives are reported in this EA. Other resources or issues that would not be important and are not considered in this EA include prime farmland, aesthetically important areas, scenic rivers, special natural resources such as aquifers, and Native American concerns. Thus, the impacts analysis in this EA focuses on the effects from multiple construction projects, changes in land use and building use due to additional operational requirements, and the effects from the operation of Helios. This analysis looks at impacts to the environment, the workers, and the offsite public.

Impacts for the No Action Alternative

The environmental impacts from taking no action would be the same as those under current operations and identified in the 1987 and 1997 EAs. Jefferson Lab would continue operating using the existing structures on the site. Environmental and public health related effects would continue to be maintained within applicable regulatory and contractual limits. To take no action on any of these proposals would deny the optimization of some resources that would allow more efficient operational support.

Impacts for the Other Alternatives Considered and Dismissed

The use of other on-site settings to position the new structures was considered. These alternate locations were found not to be viable alternatives for the following reasons: poor proximity to existing structures and utilities; more undisturbed land would be affected; and costs would be higher due to working at a new site instead of expanding an existing footprint.

The alternative to consider increasing the amount of leased offsite space is not viable for two reasons, the cost of leasing the space is more expensive in the long run than operating federally owned buildings and the proximity of staff and resources to on-site facilities would be inefficient in day to day operations.

The use of additional portable storage containers is not viable as they are an inefficient means of storing materials and take up more land area than a building designed specifically for storage. These containers cannot always be located convenient to those that need regular access and cost more money in the long term than implementing the proposed action.

Impact Summary for the Proposed Action

Environmental Impacts

Construction Impacts

Negligible to minimal impacts to the following topical areas are expected from this action: Geology and Soils, as all disturbance will be within a few feet of the surface; Floodplain, as the Jefferson Lab site is not within a 100-year floodplain; Cultural Resources, as provided by the Project Review Supervisor at the Commonwealth of Virginia Department of Historic Resources;

Socioeconomics, as labor for proposed construction actions would be drawn from the local pool of tradesmen and women with only minimal additional staffing expected; Environmental Justice, since offsite impacts would be negligible from this proposed action.

Topical areas where impacts could range from minimal to moderate, but would be limited for the duration of the construction and area stabilization are summarized here. No to minimal offsite impacts are expected. This is fully presented in Section 4.

Surface Water: Erosion and sedimentation to on-site storm water channels and storm drainage systems could result from land disturbances during on-site construction activities. Standard erosion control measures would be implemented during disturbance of soils to minimize runoff and potential deposit of sediments in surface waters.

Further development on the DOE site could result in minimal to moderate offsite impacts to surface water if changes in stormwater flows are not mitigated. Site stormwater controls are being evaluated, with the intent to implement recommended measures as needed to offset impacts due to potential facility growth. Appropriate measures will be utilized to negate or minimize any offsite impacts.

Non-radiological Air Quality: The operation of construction equipment and vehicles on-site would produce non-radiological emissions common to construction sites and localized near the site of operation. Contribution from the proposed action to offsite concentrations of regulated non-radiological air pollutants would be minimal.

Noise: Construction activities would be short-term and localized at the Jefferson Lab site. No adverse effects on human hearing would occur.

Transportation and Traffic: Additional public and site roads will have increased use during the construction activities. However, no important impacts are expected.

Pollution Prevention (P2): P2 considerations, that include waste minimization, energy efficiency, and environmentally preferable purchasing (EPP), will be taken into account during the design and construction of the proposed buildings. Special consideration will be provided to subcontractors that have demonstrated commitment to environmental protection. Opportunities to conserve natural resources during design and construction will be encouraged which will result in minimizing impacts.

Long-Term Land Use and Building Operations

The potential impacts on resources as a result of the proposed action are provided in Section 4. A brief synopsis is provided here.

There are a number of topical areas discussed under the Coastal Zone Management Act section. There are minor predicted long-term land-use impacts to terrestrial resources, aquatic resources, and wetlands. Effects on stormwater control, surface waters, and air quality could range from minimal to moderate. As considerations to operate the new buildings in an environmentally sound manner are to be addressed during the planning stage, the building functions should be optimized. For long-term building maintenance and use, the implementation of best management practices (BMPs) to keep both the buildings and their support functions operating efficiently and by using environmentally sound field practices associated with landscaping and grounds management, effects on all the above areas can be negated or minimized. These BMPs would also address resource management issues that are enforceable under this Act by taking the

operational efficiencies and practical P2 and waste management factors considered during the planning stage and putting them into daily practice and use. Using integrated P2 strategies will help to minimize both the use and waste of resources to the extent possible.

The areas of Traffic and Transportation and Groundwater that do not apply under the above Act were also reviewed for impacts. Through optimizing parking and transportation layouts in the planning process, any additional traffic considerations will not impact the environment more than at present. No effects on groundwater quality or withdrawal quantity are expected.

Helios Installation and Operation
The important potential impacts on resources as a result of Helios operations are discussed in Section 4.5. A brief synopsis is provided here.

Water: There may be only minor sources of radioactive wastewater produced under the proposed operating parameters, which would be discharged to the public sewer system in accordance with an existing permit. Because of this, no additional impacts on water quality are projected for operation under the proposed parameters. No groundwater activation by prompt radiation is expected as a result of this activity, so no effects on groundwater quality are anticipated.

Air: The operation of Helios will have minimal effects on the air quality within the FEL Addition and negligible effects outside the building and at the site boundary. The radiological impacts will be minimal but still managed under site programs to remain As Low As Reasonably Achievable (ALARA).

Safety and Health Impacts
The expected level of impact regarding safety and health concerns for each of the identified activities has been evaluated for this proposed action.

Radiological Effects.
Helios Operation: The safety and health impacts to workers and the public due to radiological activity resulting from Helios operation are very low as this is a very low hazard machine and will involve using the same type of controls and support equipment that is currently in use at Jefferson Lab.

Helios Decommissioning: Impacts to workers during decommissioning would be no different than those that exist during other routine accelerator-related activities at Jefferson Lab. No more than minimal impact on worker safety is expected, and there would be only negligible impact to the public.

Construction Hazards.
The hazards of note during construction will be typical for this type of activity, such as working on elevated areas and electrical safety. There should be no more impact than that at any typical construction project.

Non-Radiological Impacts.
Non-radiological hazards associated with the proposed action, from building operation and Helios use, include electrical hazards, chemical hazards, and non-ionizing radiation hazards (lasers), which could injure and, in extreme cases, kill occupational workers. Engineering controls as well as administrative procedures minimize accidents and would be implemented during building or Helios use and operation.

Cumulative Impacts

Environment, health, and safety impacts accumulate due to incremental contributions from each effect from the proposed action discussed above, and also from impacts expected from other ongoing or planned actions within the same geographic area.

Large construction related impacts, due to this proposed action and a combination of offsite activities, will have temporary and long term impacts on the site. On-site impacts will be minimized as addressed in this EA and it is assumed that offsite actions, that we have no control over, will be performed in a responsible manner to minimize offsite and on-site environmental impacts. Note that the proposed action would add only a small increment to the impacts from other development in the surrounding area. Considerations to minimize cumulative operational impacts from routine operation of the new facilities and their support areas would be taken into account throughout the design process. Further development of offsite areas adjoining Jefferson Lab will increase local impervious areas and add an increased potential for adverse stormwater impacts. It is expected that organizations responsible for offsite activities will address these concerns through their own planning process.

Cumulative radiological impacts from operating the site accelerators, the new Helios and the ongoing operation of CEBAF and the FEL, will be managed under existing site programs to minimize consequences to the environment, occupational health factors, and public health and safety concerns. There are no other known nearby offsite radiological sources that would contribute to area impacts except for negligible radiological sources that may be present in the Applied Research Center research areas.

Thus, the construction, operation, and use of the new buildings and Helios, even when combined with other local activities, would not result in major cumulative impacts to occupational and public health and safety.